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On Four small Stars which had been observed during the preparation of Mr. Bishop's Ecliptical Charts, and have since disappeared. By Mr. Hind.

"In the course of forming our ecliptical charts I have seen, and subsequently lost, four small planets which remained to be rediscovered. I will briefly give the particulars.

"The first occurred upon our chart for 3^h right ascension, and is actually printed on the map. Its position for 1825 is, R.A. $3^h\ 1^m\ 40^s$, N.P.D. 71° 16′, and it was observed between the 8th and 11th of February, 1851, while I was finishing off the map for the engraver. By some oversight I did not discover its disappearance from the above place until August following, when it was useless to search after it.

"The second planet was missed, 1852, Oct. 11, having been entered in the previous spring in R.A. $7^h\ 46^m\ 55^s$, N.P.D. 68° 14′ 5″, for the epoch of the map (1825). It was of the 11th magnitude, and like the last has appeared by an oversight upon the published chart. Unfortunately, I cannot be quite sure of the date when this object was entered. It was certainly between 1852, February 25, and the middle of April; most probably about the beginning of the latter month. The third missing star, which I presume to have been also of a planetary character, was marked on October 25, 1852, in R.A. $3^h\ 23^m\ 40^s$, N.P.D. 68° 30′, near another of the same (eleventh) magnitude upon the map for that hour of right ascension. I missed it on December 8, and subsequently made several fruitless attempts to rediscover it; the want of consecutive fine nights, however, was against my finding the planet again. I suspect it moved away to the north, and that the inclination must have been rather large.

"The fourth object was missed from the chart, Hour IV., last month. I cannot at present recover the date of entry, though it must have fallen during the first eight months of 1852. It was of the eleventh magnitude, and appears upon the published map in R.A. $4^h\ 5^m\ 25^s$, N.P.D. 66° 40′. Did I not know from experience how easy it is to omit noticing the absence of a small star from its place upon the map, I might be inclined to consider the second and fourth as variable stars; the first and third I am satisfied were planets, and the other two I think were probably planets also."

"*Mr. Bishop's Observatory, Feb.* 11, 1853."

The American Ephemeris and Nautical Almanac for the Year 1855. Published by authority of the Secretary of the Navy. (Pp. 474, including an Appendix, pp. 78, royal 8vo.) Washington, 1852.

A fresh proof of the interest felt by our Transatlantic brethren in the advancement of astronomical science, and of their ability in carrying out views of practical utility, has recently been afforded by the publication of the handsome volume above entitled. The

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preparation of this work was begun in the latter part of the year 1849, in pursuance of an act of Congress approved on the 3d of March of that year. Lieut. Davies, U.S. Navy, has been appointed Superintendent of the Ephemeris. The theoretical part has been placed under the direction of Prof. Peirce.

The work is divided into two distinct parts. The first part is appropriated to nautical purposes, and is calculated for the meridian of Greenwich. The second part is designed for the promotion of astronomical science, and is adapted to the meridian of Washington.

The nautical part consists of an ephemeris of the Sun and Moon and of the planets *Venus*, *Mars*, *Jupiter*, and *Saturn*, together with tables of Lunar Distances. There are also appended the rectangular co-ordinates used in computing the ephemeris of the Sun.

The ephemeris adapted to each month of the year is comprised in *sixteen* pages.

Page i. is devoted to the Sun. The computations are for *apparent noon*, and the co-ordinates are exclusively those of *right ascension* and *declination*.

Page ii. contains the tables of the semidiameter, horizontal parallax, and time of meridian passage of the Moon. There are columns exhibiting the variations of the horizontal parallax in one hour, at noon and midnight, and also a similar column for the variation of the time of meridian passage.

Pages iii.–x. contain the apparent right ascension and declination of the Moon for every hour of each day of the month, with columns of differences for one minute.

Pages xi.–xvi. are devoted to the Lunar Distances. The arrangement is similar to that employed in the *Nautical Almanac*.

The planetary ephemeris contains the apparent right ascension and declination at Greenwich noon of each of the four planets above mentioned, with the variations of both co-ordinates for one hour; also the time of meridian passage.

The following remarks have been suggested by an examination of the second part of the work.

The logarithms of the quantities A, B, C, D, used in correcting the places of the stars are computed to *five* places of decimals.

The values of the constants of Aberration, Precession, and Nutation employed in these computations are those assigned by MM. Peters and Struve.

The mean places of 100 principal fixed stars are given. These have been derived either from Airy's twelve-year Catalogue of 2156 stars or from the Catalogue of the British Association.

The tables of the apparent places of the principal stars for the upper transit at Washington are arranged similarly to the corresponding tables of the *Nautical Almanac*.

The solar ephemeris is computed both for *mean* and *apparent* noon.

The ephemeris of the Moon's place contains the apparent right ascension and declination at the upper and lower culminations,

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with the requisite columns for reduction. There is also a column with numbers for reference to the various stars which accompany the successive culminations of the Moon. A separate list of all the moon-culminating stars is inserted immediately after this ephemeris.

Tables are given for computing the Libration of the Moon, both in longitude and latitude.

The ephemeris of *Mercury* contains the apparent right ascension and declination at mean noon and transit, with corresponding logarithms for interpolation; also the mean solar time of meridian transit.

The ephemeris of *Venus* is similar to that of *Mercury*, except that it exhibits the logarithms of motion in a sidereal minute both in right ascension and declination, with the logarithms of the factors for second differences.

The ephemeris of each of the remaining planets is similar to that of *Venus*, except that the apparent right ascension and declination are calculated for sidereal noon and for *transit*.

There is no ephemeris given of any of the small planets revolving between *Mars* and *Jupiter*.

The rectangular co-ordinates of the Sun are given for every twelve hours, with the corrections for reducing them to the mean equinox of 1855·0. The true longitude, the latitude, and the logarithm of the radius vector, are also computed for the same intervals.

There are tables of the heliocentric co-ordinates of the planets. The table for each planet contains the rectangular co-ordinates, the logarithm of the radius vector, and the longitude of the planet in its orbit. The tables of *Mercury* and *Venus* are calculated for every five days; those of *Mars* and *Jupiter* for every ten days; those of *Saturn* and *Uranus* for every twenty days; and those of *Neptune* for every forty days.

The ephemeris of the Moon was calculated from Plana's theory, combined with Hansen's inequalities due to the disturbing action of *Venus*, Airy's corrections of the lunar elements, and Hansen's secular inequalities of the mean motion of the lunar perigee. An empirical correction by Mr. Longstreth, of Philadelphia, was also used.

The ephemeris of *Mercury* was derived from the theory of the planet given by Le Verrier in the *Connaissance des Temps* for 1848. The ephemeris of *Venus* was founded on Lindenau's tables, applying Mr. Hugh Breen's corrections of the elements (*Mem. Ast. Soc.* vol. xviii.); Airy's Long Inequality (*Phil. Trans.* 1832); and Le Verrier's secular variations of the elements (*Connaissance des Temps*, 1841). The ephemeris of *Uranus* was calculated from Bouvard's ellipse, combined with Le Verrier's perturbations by *Jupiter* and *Saturn* (*Connaissance des Temps*, 1849); and Peirce's corrections of the elements and perturbations due to *Neptune*. The ephemeris of *Neptune* was founded on Walker's orbit and Peirce's theory of its perturbations. In other respects the data of the planetary ephemeris agree very nearly with those adopted in the *Nautical Almanac*.

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There are inserted in this part of the work the elements of the solar and lunar eclipses which will happen in the year 1855. Tables are also given, by means of which the solar eclipses may be accurately computed for any assigned place. These tables are founded on a modification of Bessel's formulæ suggested by Mr. T. Safford, jun.

Tables are given for calculating the occultations of all the stars down to the *sixth magnitude*, contained in the Catalogue of the British Association, which can be occulted during the year 1855. The method of Bessel forms the basis of computation.

In addition to the usual list of eclipses, &c. of *Jupiter's* satellites, a complete set of tables is given, by the aid of which the configuration of the satellites corresponding to *any assignable time* may be readily ascertained.

There is a table by Dr. B. A. Gould, containing the geographical positions of the principal observatories which are at present in astronomical activity, or which have been so within the last quarter of a century. The latest and most trustworthy determinations have been employed in its preparation. The following is the position assigned to the Washington Observatory:—N. Lat. $38^\circ\ 53'\ 39''\cdot25$ (*Ast. Journal*, iii. 12); Long. W. from Greenwich, as derived from data of the U.S. Coast Survey up to 1852, $5^h\ 8^m\ 11^s\cdot2$.

The Appendix, in addition to other matters of less importance, contains Chauvenet's tables for correcting lunar distances and an ephemeris of *Neptune* for the year 1853.

Various individuals have co-operated in the computation of this Ephemeris. The results have in most instances passed under the final revision of Prof. Peirce.

It may be remarked, in conclusion, that the work is beautifully got up. The order of arrangement is neat and lucid; the printing is in a clear bold type, and the paper is of superior quality. The modern style of numerals is used throughout, apparently without any disadvantage.

Upon the probable Identity of the Solar Faculæ with the rose-coloured Protuberances seen during a Total Eclipse of the Sun. By M. Schweizer, Astronomer of the Institute of Geodesy, Moscow. (*Ast. Nach.* No. 849, p. 133.)

In an account of the total eclipse of the sun of August 8, 1850, observed at Honululu, M. Arago threw out a conjecture relative to the possible identity of the solar faculæ with the red protuberances seen around the margin of the moon during the occurrence of the totality.[*] M. Schweizer was induced by this circumstance to institute a series of observations of the solar faculæ about the time of the total eclipse of July 28, 1851, and to cause drawings of their appearances to be carefully executed by some of the most

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[*] *Comptes Rendus*, April 21, 1851.